

Complete Summary

GUIDELINE TITLE

Ultrasonographic examinations: indications and preparation of the patient.

BIBLIOGRAPHIC SOURCE(S)

Finnish Medical Society Duodecim. Ultrasonographic examinations: indications and preparation of the patient. In: EBM Guidelines. Evidence-Based Medicine [CD-ROM]. Helsinki, Finland: Duodecim Medical Publications Ltd.; 2002 Dec 2 [Various]. [20 references]

COMPLETE SUMMARY CONTENT

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 INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT
 CATEGORIES
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SCOPE

DISEASE/CONDITION(S)

- Ascites
- Abdominal infections
- Diseases of the pancreas, liver, gallbladder, kidney, adrenal gland, spleen, urinary bladder, and prostate
- Aortic aneurysm and dissection
- Blood vessel diseases and complications of vascular surgery
- Pleural or pericardial effusion
- Thyroid nodules
- Injuries to soft tissues and joints of the extremities
- Diseases of the testis and epididymis
- Cysts, hematomas, abscesses, and tumors

GUIDELINE CATEGORY

Diagnosis
 Evaluation

CLINICAL SPECIALTY

Family Practice
Internal Medicine
Radiology

INTENDED USERS

Health Care Providers
Physicians

GUIDELINE OBJECTIVE(S)

Evidence-Based Medicine Guidelines collects, summarizes, and updates the core clinical knowledge essential in general practice. The guidelines also describe the scientific evidence underlying the given recommendations.

TARGET POPULATION

Individuals with suspected clinical problems that can be diagnosed or evaluated through ultrasonographic examination

INTERVENTIONS AND PRACTICES CONSIDERED

1. Patient preparation (no eating for 6 hours or drinking for 2 hours before examination)
2. Abdominal ultrasonography
3. Ultrasonography of the blood vessels
4. Thoracic ultrasonography
5. Thyroid and parathyroid ultrasonography
6. Ultrasonography of soft tissues and joints of the extremities
7. Ultrasonography of the testis and epididymis
8. Ultrasonographically guided biopsies and punctures
9. Ultrasonographically guided placement of central venous catheters

MAJOR OUTCOMES CONSIDERED

- Accuracy of diagnosis
- Sensitivity and specificity of ultrasound in diagnosis of acute appendicitis
- Sensitivity and specificity of ultrasound in diagnosis of arterial disease of the lower extremities
- Sensitivity and positive predictive value of ultrasound in screening for deep vein thrombosis in asymptomatic postoperative patients
- Accurate placement of central venous catheters and number of complications related to placement

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Hand-searches of Published Literature (Secondary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The evidence reviewed was collected from the Cochrane database of systematic reviews and the database of abstracts of reviews of effectiveness (DARE). In addition, the Cochrane Library and medical journals were searched specifically for original publications.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Levels of Evidence

A: Strong research-based evidence. Several relevant, high-quality scientific studies with homogeneous results.

B: Moderate research-based evidence. At least one relevant, high-quality study or multiple adequate studies.

C: Limited research-based evidence. At least one adequate scientific study.

D: No scientific evidence. Expert panel evaluation of other information.

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Not stated

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

The levels of evidence [A-D] supporting the recommendations are defined at the end of the "Major Recommendations" field.

Abdominal Ultrasonography

Upper Abdomen

- Includes the liver, gallbladder, biliary tract, pancreas, spleen, kidneys, aorta, and retroperitoneal space (for details see below)
- The patient should not eat for 6 hours and drink for 2 hours before the examination.

Ascites

- A clinically suspected ascites can be confirmed in patients with, for example, heart failure, cirrhosis of the liver, nephrotic syndrome, or abdominal tumour who would probably benefit from the treatment of the condition.
- No preparations are needed.

Abdominal Infections

- Ultrasonography may be helpful in detecting acute infection or peritonitis when the indications for surgery are determined.
- When intra-abdominal abscess as a complication of abdominal surgery or appendicitis (Orr, Porter, & Hartman, 1995; DARE-951712, 1999) [B] is suspected.
- Ultrasonography is NOT a routine examination in suspected acute appendicitis (although the sensitivity of a negative examination is not sufficient to exclude appendicitis, an inflamed appendix can often be seen) (Orr, Porter, & Hartman, 1995; DARE-951712, 1999) [B].

Pancreas

- Included in the upper abdominal examination
- Indications
 - Suspicion of moderate or severe pancreatitis
 - Suspicion of a pancreatic pseudocyst
 - Suspicion of pancreatic carcinoma
- Pancreatic ultrasonography is rather insensitive and has many sources of error.
- The patient should not eat for 6 hours and drink for 2 hours before the examination.

Liver

- Included in the upper abdominal examination
- All liver diseases: hepatomegaly, cirrhosis, tumours and metastases, cysts and abscesses, biliary obstruction, abdominal trauma, jaundice
- The patient should not eat for 6 hours and drink for 2 hours before the examination.

Kidneys and Adrenal Glands

- Included in the upper abdominal examination
- Renal tumours, cysts, polycystic disease, hydronephrosis, trauma, and urologically silent kidney
- Adrenal adenomas can often be diagnosed (but not excluded) by ultrasonography.
- Primary examination in children with urinary tract infection to exclude structural abnormalities
- No preparations are needed
- In the assessment of recurrent abdominal pain in children, the patient should not eat for 6 hours and drink for 2 hours before elective examination.

Spleen

- Included in the upper abdominal examination
- Splenomegaly, ruptured spleen in abdominal trauma
- The patient should not eat for 6 hours and drink for 2 hours before the examination.

Gallbladder

- Included in the upper abdominal examination
- Primary examination in the diagnostics of gallstone disease and cholecystitis.
- Cancer of the gallbladder cannot be ruled out by ultrasonography.
- The patient should not eat for 6 hours and drink for 2 hours before the examination.

Urinary Bladder and Prostate

- Investigation of haematuria, diagnosis of urinary retention
- Residual urine after voiding (see related Evidence-Based Medicine [EBM] guideline on "Determining the Volume of Residual Urine by Ultrasonography")

- Size of the prostate, prostatic nodules
- Preparations: the patient should have a full bladder during the examination.
- Transurethral ultrasonography of the prostate is a basic examination by urologists in the assessment of prostatic disease.

Pelvic Ultrasonography and Ultrasonography During Pregnancy

- See the related EBM guidelines on "Ultrasound Scanning During Pregnancy" and "Gynaecologic Ultrasound Examination."

Ultrasonography of Blood Vessels

Aorta

- Aortic aneurysm and dissection
- Preparations: the patient should not eat for 6 hours and drink for 2 hours before the examination (with the exception of emergencies).

Vascular Prostheses

- Surgical complications: haematoma, aneurysm, or abscess
- Preparations: the patient should not eat for 6 hours and drink for 2 hours before the examination.

Compression and Doppler Examination of the Lower Extremities

- Arterial obstruction and occlusion of the lower extremities (Koelemay et al., 1996; DARE-960604, 1999) [B]
- Deep venous thrombosis of the femoral and popliteal veins (Kearon et al., 1998; DARE-988578, 2000) [B] Ultrasonography is insensitive in the examination of calf veins (Wells et al., 1995; DARE-959305, 1999) [A].
- The function of superficial veins can be investigated when planning surgery for varicose veins.
- No preparations are needed.

Carotid Arteries

- Carotid stenosis, follow-up after endarterectomy
- No preparations are needed.

Thoracic Ultrasonography

Pleural and Pericardial Cavity

- Suspected pleural or pericardial effusion
- No preparations are needed.
- Echocardiography (by cardiologists)--see related EBM guideline on "Echocardiology"

Thyroid and Parathyroid Ultrasonography

- Primary examination of a thyroid nodule
- No preparations are needed.

Soft Tissues and Joints of the Extremities

- Assessment of the need of surgical treatment for muscle and tendon injuries (e.g., rotator cuff, Achilles tendon, patellar tendon)
- Baker's cyst, bursal fluid, peritendinitis
- Diagnosis of synovitis
- Confirmation of the diagnosis of a ganglion
- A limp or hip pain in children (effusion of the hip joint)
- No preparations are needed.

Maxillary and Frontal Sinuses

- Diagnosis of sinusitis, follow-up the therapy
- No preparations are needed.
- See related EBM guideline on "Diagnosis of Sinusitis"

Testis and Epididymis

- Enlarged or painful scrotum (differential diagnosis of testis torsion and epididymitis, varicocele, hydrocele, spermatocele, scrotal hernia, haematoma, or contusion)
- Always when testicular tumour is suspected
- Investigation of male infertility
- No preparations are needed.

Ultrasonographically Guided Biopsies and Punctures

- Evacuation of cysts, haematomas, and abscesses
- Cytological and histological specimens of suspected tumours (e.g. breast, thyroid gland)

Ultrasonographic Examinations by General Practitioners and Other Non-specialists in Radiology

- Ultrasonography is a dynamic examination that must be interpreted during the examination. The interpretation cannot usually be reliably performed from printouts afterwards.
- A doctor performing ultrasonographic examinations should be trained by a specialist.
- Some ultrasonographic examinations are suitable to be performed by any doctors, and some for non-radiologists with a special training.
- A positive finding is significant (be careful not to harm the patient with false positive findings): a negative finding in ultrasonography performed by an inexperienced examiner should not be used to rule out a treatable disease.

Any Doctor Can Perform the Following Examinations after Local Training

- Determination of the size and position of a fluid cavity before puncture (urinary bladder, pleural space, ascites, abscess)
- Determination of residual urine volume and size of the prostate (see related EBM guideline on "Determining the Volume of Residual Urine by Ultrasonography")

A Doctor with Special Training for Ultrasonography Can Perform the Following Examinations

- Search for gallstones and signs of acute cholecystitis (thickened gallbladder wall and/or halo) in a patient with upper abdominal pain
- Search for hydronephrosis or dilated urinary tract in patient with urinary symptoms
- Diagnose or exclude abdominal aortic aneurysm
- Detect ascites or intra-abdominal bleeding (e.g. in a patient with mild, blunt abdominal trauma that does not require referral on the basis of the history or clinical presentation)
- Estimate the size of the spleen (a length exceeding 10-12 cm can be considered abnormal)
- Differentiate between a fluid collection or abscess from other subcutaneous masses (confirmation by puncture can be performed after ultrasonography)
- Some ultrasonographic examinations during pregnancy (see related EBM guideline "Ultrasound Scanning during Pregnancy")

Related Evidence

- Compared to the landmark technique for placement of internal jugular and subclavian central venous catheters, ultrasound guidance significantly increases the probability of success and decreases the number of complications (Randolph et al., 1996; DARE-970060, 1999) [A].

Definitions:

Levels of Evidence

A: Strong research-based evidence. Several relevant, high-quality scientific studies with homogeneous results.

B: Moderate research-based evidence. At least one relevant, high-quality study or multiple adequate studies.

C: Limited research-based evidence. At least one adequate scientific study.

D: No scientific evidence. Expert panel evaluation of other information.

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

[References open in a new window](#)

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

Concise summaries of scientific evidence attached to the individual guidelines are the unique feature of the Evidence-Based Medicine Guidelines. The evidence summaries allow the clinician to judge how well-founded the treatment recommendations are. The type of supporting evidence is identified and graded for select recommendations (see the "Major Recommendations" field).

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Appropriate use of ultrasonography for diagnosis and evaluation of a variety of clinical conditions

POTENTIAL HARMS

False positive or false negative findings have the potential to harm the patient.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

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ROM]. Helsinki, Finland: Duodecim Medical Publications Ltd.; 2002 Dec 2
[Various]. [20 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2000 Apr 18 (revised 2002 Dec 2)

GUIDELINE DEVELOPER(S)

Finnish Medical Society Duodecim - Professional Association

SOURCE(S) OF FUNDING

Finnish Medical Society Duodecim

GUIDELINE COMMITTEE

Editorial Team of EBM Guidelines

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Finnish Medical Society Duodecim.
Ultrasonographic examinations: indications and preparation of the patient.
Helsinki, Finland: Duodecim Medical Publications Ltd.; 2001 Oct 24. Various p.

GUIDELINE AVAILABILITY

This guideline is included in a CD-ROM titled "EBM Guidelines. Evidence-Based Medicine" available from Duodecim Medical Publications, Ltd, PO Box 713, 00101 Helsinki, Finland; e-mail: info@ebm-guidelines.com; Web site: www.ebm-guidelines.com.

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on August 28, 2001. The information was verified by the guideline developer as of October 26, 2001. This summary was updated by ECRI on December 9, 2002 and April 2, 2004.

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The logo for FIRST GOV, with "FIRST" in blue and "GOV" in red, and a small red star above the "I".

